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NCBC GULFPORT
5090.3a

DECISION DOCUMENT FOR SITE 5 HEAVY EQUIPTMENT TRAINING AREA LANDFILL
NCBC GULFPORT MS
1/1/2009
TETRA TECH

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 1
01/19/09

Decision Document
for
Site 5 – Heavy Equipment Training Area Landfill

Naval Construction Battalion Center
Gulfport, Mississippi

Contract Task Order 0292

January 2009

NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST
NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

Rev. 1
01/19/09

DECISION DOCUMENT
FOR
SITE 5 - HEAVY EQUIPMENT TRAINING AREA LANDFILL

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Southeast
NAS Jacksonville
Jacksonville, Florida 32212-0030

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
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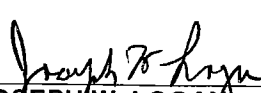
CONTRACT NO. N62467-94-D-0888
CONTRACT TASK ORDER 0292

JANUARY 2009

PREPARED UNDER THE SUPERVISION OF:



JOSEPH W. LOGAN
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PITTSBURGH, PENNSYLVANIA

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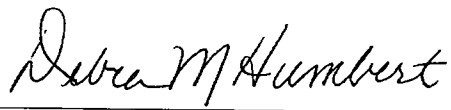

DEBRA M. HUMBERT
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

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TABLES

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ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
ARAR	Applicable or Relevant and Appropriate Requirement
BaA	Benzo(a)anthracene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COC	Chemical of Concern
DPT	Direct-push technology
ESV	Ecological screening value
FS	Feasibility Study
HHRA	Human health risk assessment
HLA	Harding Lawson Associates
HO	Herbicide Orange
IAS	Initial Assessment Study
LTM	Long-term monitoring
LUC	Land use control
MCL	Maximum Contaminant Level
MDEQ	Mississippi Department of Environmental Quality
NAVFAC SE	Naval Facilities Engineering Command Southeast
NCBC	Naval Construction Battalion Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NEPA	National Environmental Policy Act
ng/kg	Nanogram per kilogram
NPW	Net present worth
O&M	Operation and Maintenance
pg/L	Picogram per liter
ppb	Part per billion
ppq	Part per quadrillion
PRG	Preliminary Remediation Goal
RAO	Remedial Action Objective
RBC	Risk-based concentration
RBCV	Risk-cased concentration value
RI	Remedial Investigation

SARA	Superfund Amendments and Reauthorization Act
SVOC	Semivolatile organic compound
TBC	To Be Considered
TEQ	Toxicity Equivalency Quotient
TRG	Target Remediation Goal
TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

This Decision Document states the selected remedy for Site 5 - Heavy Equipment Training Area Landfill at Naval Construction Battalion Center (NCBC) Gulfport, Mississippi. The selected remedy for Site 5 was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, as implemented by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and to the extent practicable the National Environmental Policy Act (NEPA) of 1969.

Site 5 is not listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and therefore does not have a United States Environmental Protection Agency (USEPA) identification number.

The objectives of this Decision Document are as follows:

- Summarize site conditions and risks before the remedial action
- Demonstrate that the remedial action is protective of human health and the environment
- State all the actions taken to comply with federal and state requirements
- Provide the details of the remedial action chosen

The State of Mississippi, as represented by the Mississippi Department of Environmental Quality (MDEQ), has been the lead regulatory agency during the assessment and investigations at Site 5. In this capacity, the state has reviewed the following documents associated with environmental assessment and investigations at Site 5:

- Initial Assessment Study (IAS) of NCBC Gulfport [Naval Energy and Environmental Support Activity (NEESA), 1985].
- Confirmation Study [Harding Lawson Associates (HLA), 1987].
- Direct Push Technology Sampling Report (Morris-Knudsen, 1997).
- Surface Water and Sediment Dioxin Delineation Report [ABB Environmental Services, Inc. (ABB-ES), 1997].
- Groundwater Monitoring Report (HLA, 1999).
- Draft Remedial Investigation (RI) [Tetra Tech NUS, Inc. (TtNUS), 2007].
- Feasibility Study (FS) (TtNUS, 2008d).

The selection process for a remedial alternative for Site 5 used USEPA guidance documents for the presumptive remedy for municipal and military landfills. MDEQ has concurred with the selected remedial

action strategy for Site 5 and agrees that the chemicals of concern (COCs) were appropriately addressed in the evaluations of alternatives in the FS for Site 5 (TtNUS, 2008d). The COCs for this site are as follows:

- Soil: Arsenic concentrations in the soil were greater than the MDEQ regulatory level for unrestricted use, but all were less than the MDEQ regulatory level for restricted use**.** Dioxins were detected site wide in soil at concentrations greater than the MDEQ regulatory level for unrestricted use, but all were less than the MDEQ regulatory level for restricted use.

- Sediment: Arsenic was detected in all sediment samples at concentrations greater than the MDEQ regulatory level for unrestricted use, but only the concentration in one sample was greater than the MDEQ regulatory level for restricted use. Dioxins were detected in all sediment samples, but the concentration in only one sample was greater than the MDEQ regulatory level for unrestricted use but was less than the MDEQ regulatory level for restricted use.

- Groundwater: Benzo(a)anthracene (BaA) and dioxins were detected at concentrations greater than MDEQ regulatory levels in one on-site monitoring well.

Other technologies were considered as part of the technology screening step in the FS. Excavation with off-site disposal and excavation with on-site treatment and disposal were considered but were eliminated from further consideration because of cost. Based on the technology screening step in the FS, Remedial Action Objectives (RAOs) defined in the Proposed Plan, site conditions, waste characteristics, volume of contaminated media, and the presumptive remedy of containment for the site, the following two potential remedial action alternatives were developed and evaluated in the FS:

- Alternative 1 – No Action
- Alternative 2 – Cap, Ditch Lining, Land Use Controls (LUCs), and Groundwater Monitoring

2.0 SITE LOCATION AND DESCRIPTION

NCBC Gulfport is located in the western part of Gulfport, Mississippi, in the southeastern part of Harrison County, about 1.2 miles north of the Gulf of Mexico (Figure 2-1). Site 5, a former landfill of approximately 6 acres in size is located in the southwestern section of NCBC Gulfport (Figures 2-1 and 2-2). Geological cross-section locations are shown on Figure 2-3, and geological cross-sections of the site are shown on Figures 2-4 and 2-5. The site is currently used for heavy equipment (bulldozer and forklift) training. It is located approximately 200 feet west of the intersection of 4th Street and Colby Avenue. The northwestern boundary is the driving range, and the western and southern boundaries are defined by a drainage ditch.

The site is currently flat, but a large earthen mound used for the heavy equipment training was located near the middle of the site for several years. An asphalt road at the site is used for truck driver training. The drainage ditch at Site 5 is approximately 30 feet wide, and the water in the ditch is typically between 1 to 4 feet deep. The site is mostly free of vegetation but is bordered by trees and various other types of vegetation on all but the northern edge. The base boundary is located about 40 feet to the west, and family housing is located approximately 50 feet to the south.

Several environmental investigations were performed at Site 5, starting with the dioxin delineation studies conducted in 1997 for on-site and off-site surface water drainage features. The investigations, which are detailed in Section 3.0, identified the areas used for landfilling activities, and identified groundwater contamination by BaA and dioxins, and soil and sediment contamination by arsenic and dioxins.

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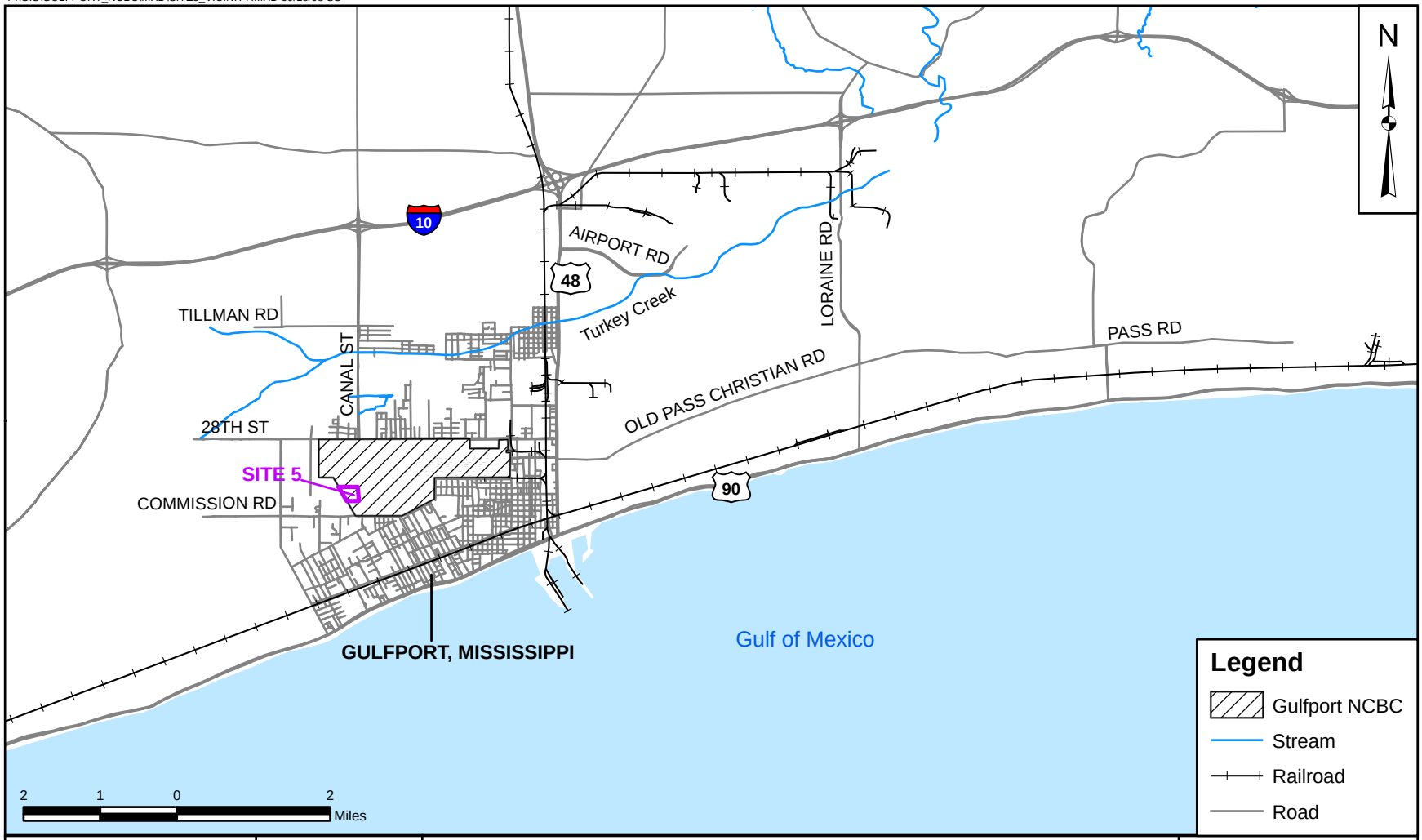
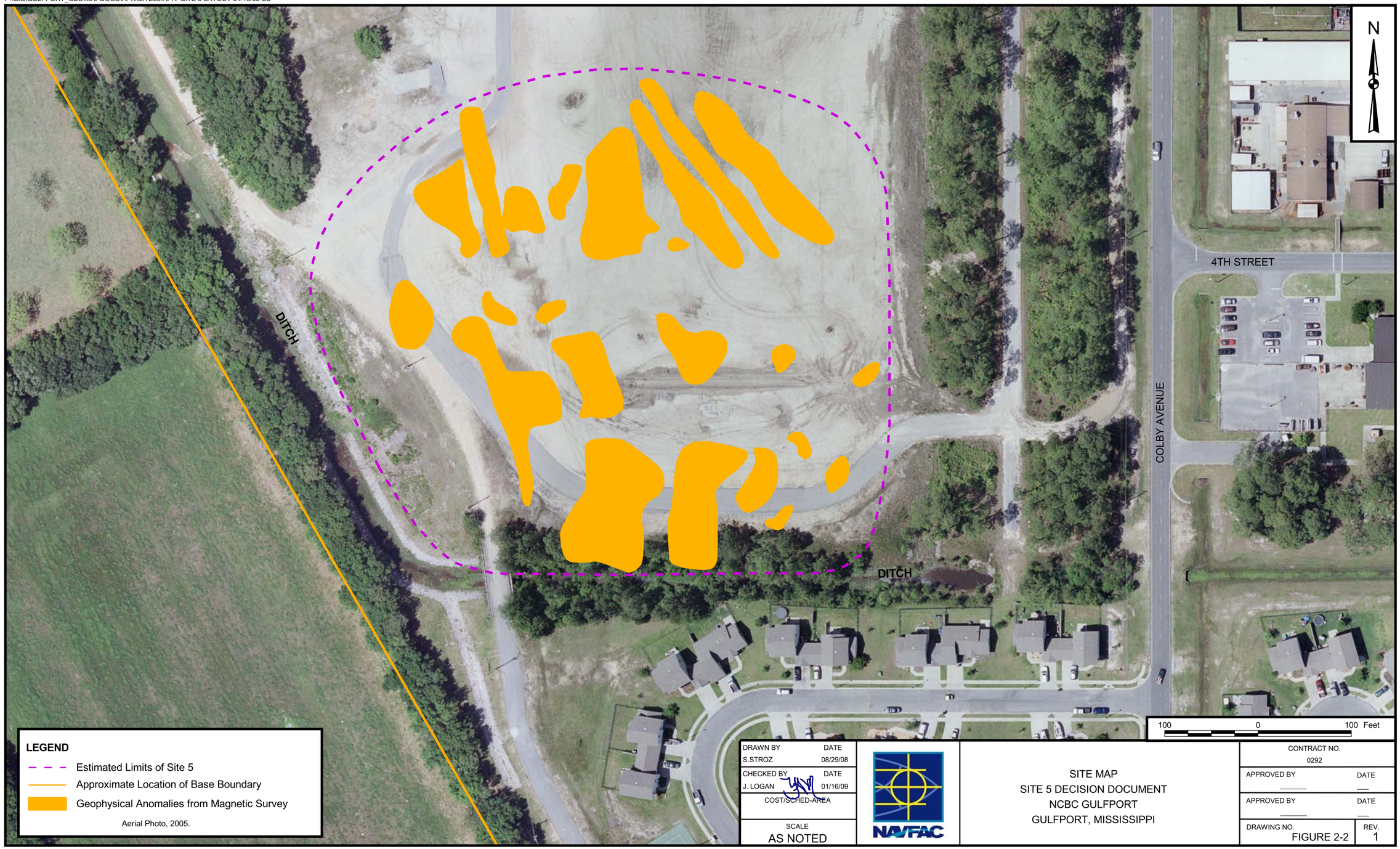


DRAWN BY S. STROZ	DATE 08/29/08		CONTRACT NUMBER 0292
CHECKED BY J. LOGAN	DATE 09/18/08	VICINITY MAP SITE 5 DECISION DOCUMENT NCBC GULFPORT GULFPORT, MISSISSIPPI	APPROVED BY ___ DATE ___
COST SCHEDULE AREA			APPROVED BY ___ DATE ___
SCALE AS NOTED	NAVFAC		FIGURE NO. FIGURE 2-1 / REV 0

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE05.APR SITE 5 LAYOUT 01/16/09 SS



LEGEND

- Estimated Limits of Site 5
- Approximate Location of Base Boundary
- Geophysical Anomalies from Magnetic Survey

Aerial Photo, 2005.

DRAWN BY S.STROZ	DATE 08/29/08
CHECKED BY J. LOGAN	DATE 01/16/09
COST/SCHED-AREA	
SCALE AS NOTED	

NAVFAC

SITE MAP
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO. 0292	
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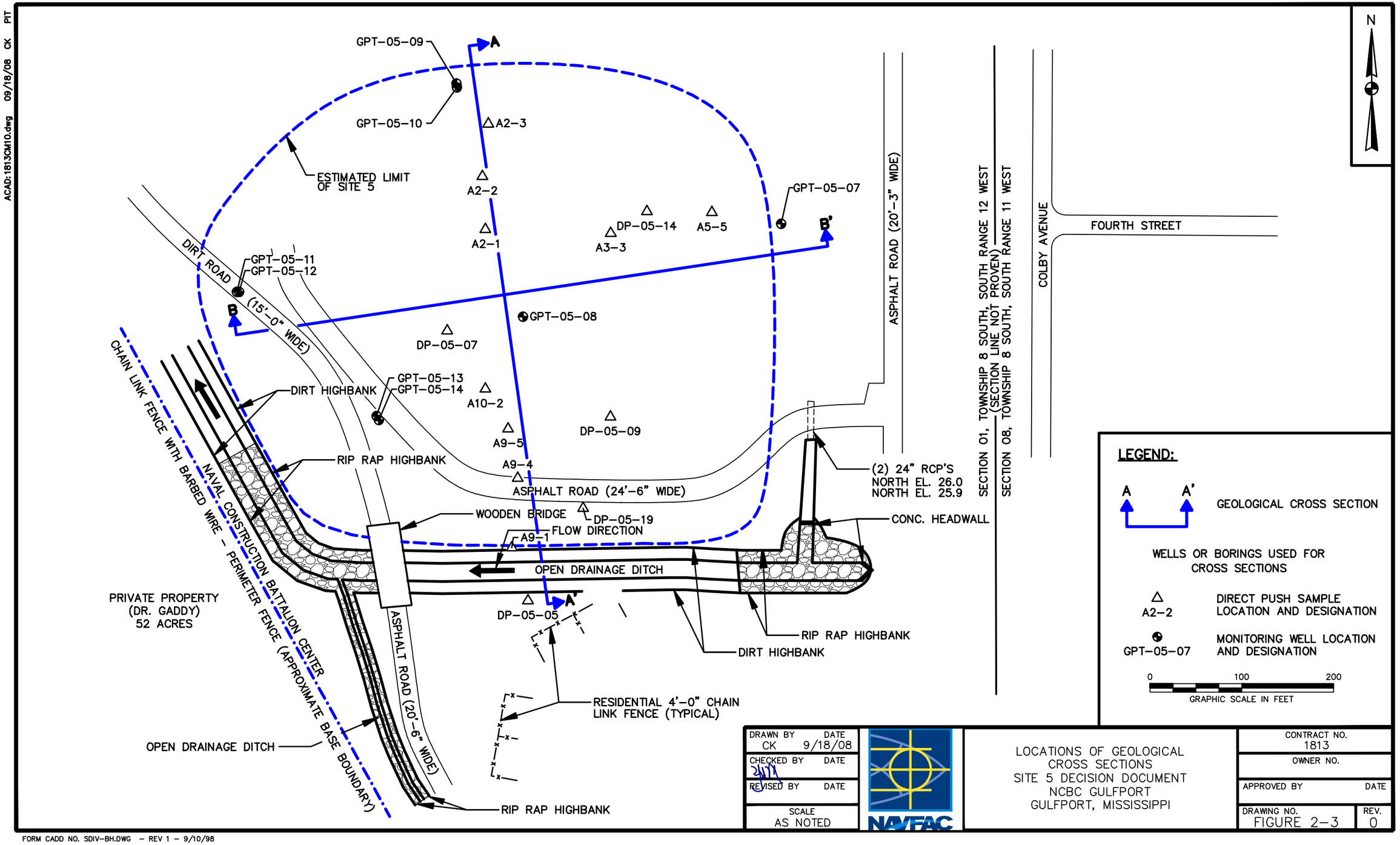

LEGEND:

A A' — GEOLOGICAL CROSS SECTION

WELLS OR BORINGS USED FOR CROSS SECTIONS

△ A2-2 — DIRECT PUSH SAMPLE LOCATION AND DESIGNATION

⊕ GPT-05-07 — MONITORING WELL LOCATION AND DESIGNATION

0 100 200

GRAPHIC SCALE IN FEET

DRAWN BY CK	DATE 9/18/08
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

LOCATIONS OF GEOLOGICAL CROSS SECTIONS
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO. 1813	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 2-3	REV. 0

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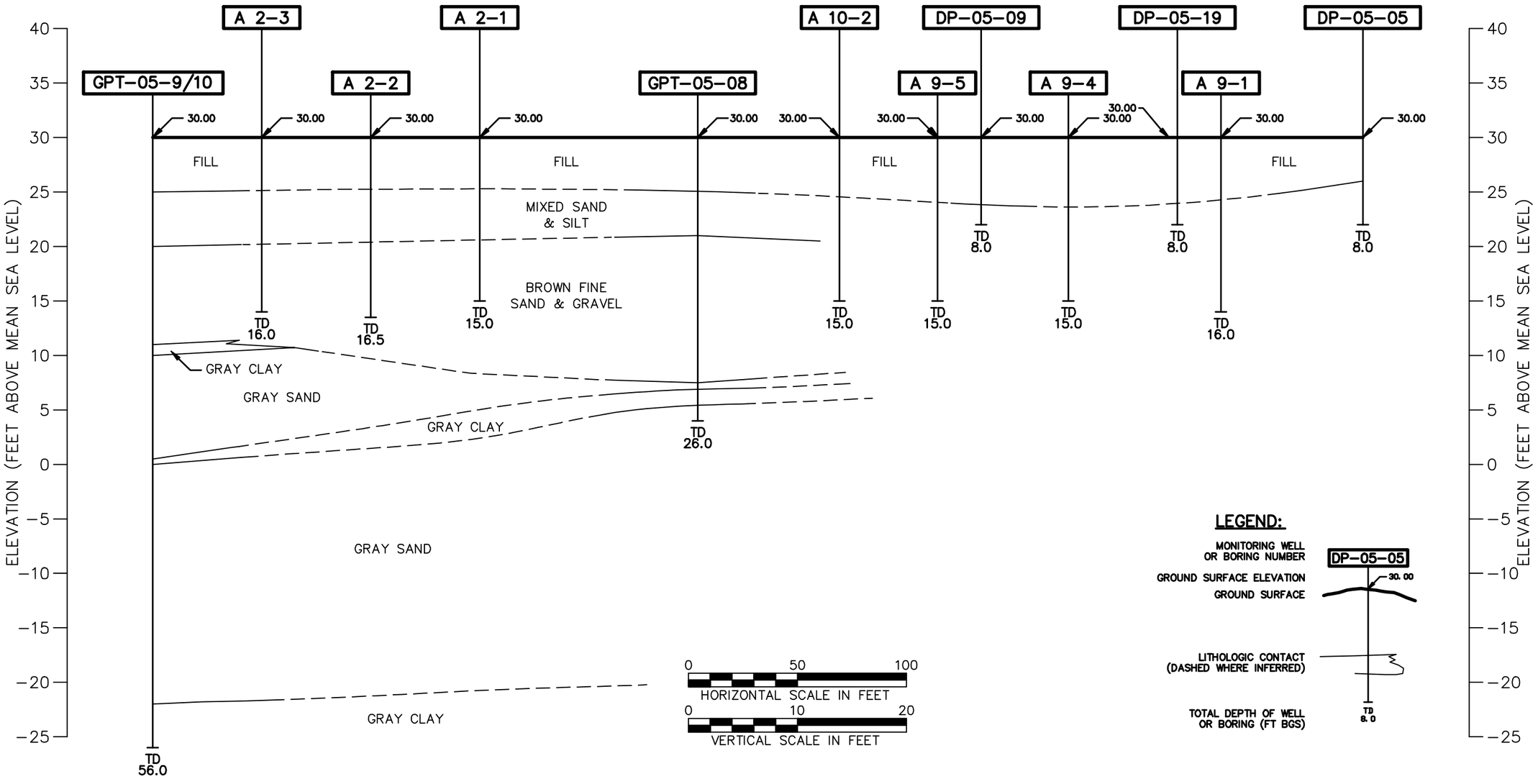
A NORTH — A' SOUTH



0 50 100
HORIZONTAL SCALE IN FEET

0 10 20
VERTICAL SCALE IN FEET

LEGEND:

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REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

CROSS SECTION A–A'
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO. 1813	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 2-4	REV. 0

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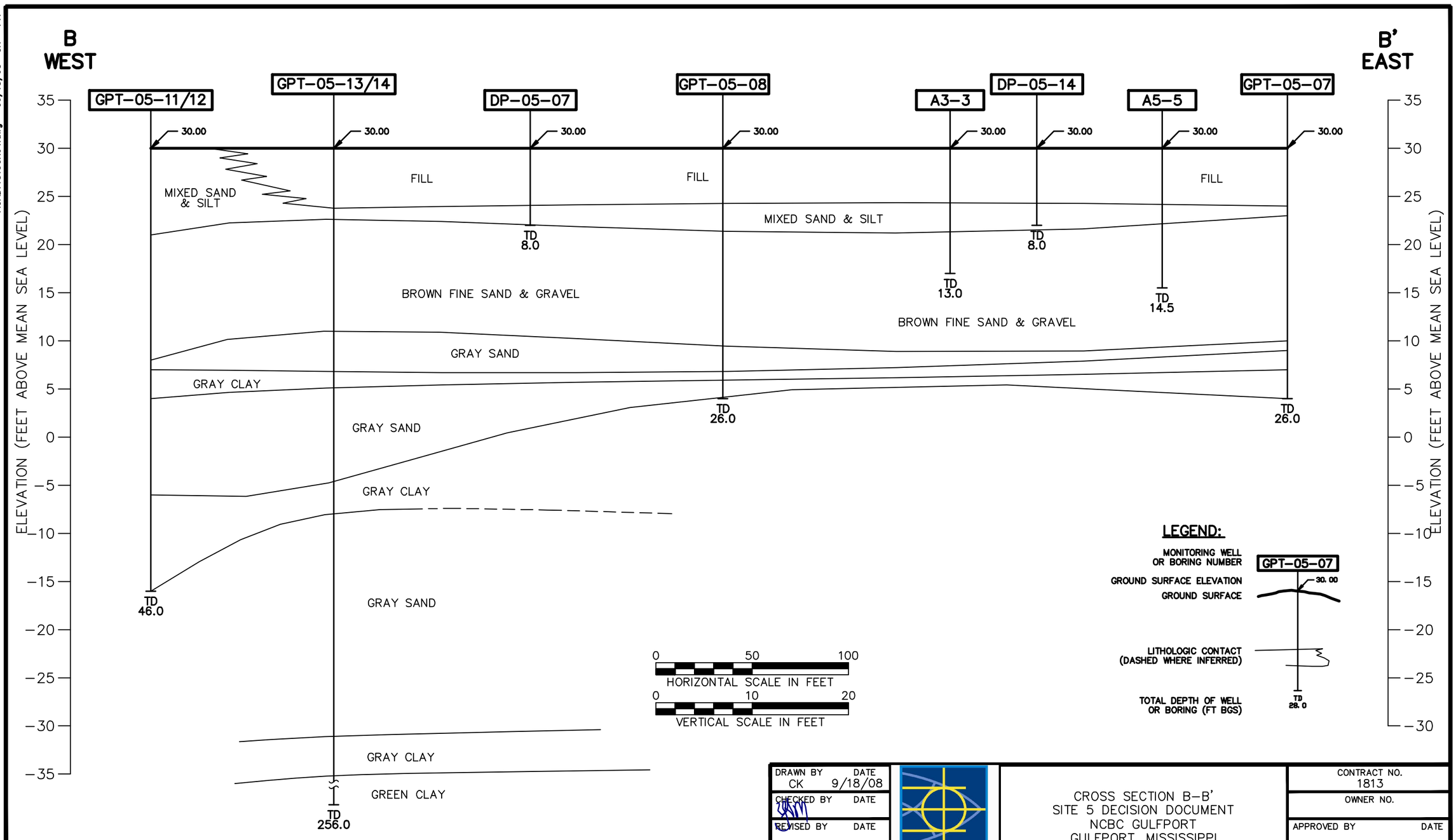
B WEST — B' EAST



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SCALE AS NOTED	

CROSS SECTION B–B'
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO. 1813	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 2–5	REV. 0

FORM CADD NO. SDIV-BH.DWG - REV 2 - 6/19/06

3.0 SITE CONDITIONS

The following is a discussion of site conditions as reported in previous investigation reports at Site 5 and NCBC Gulfport. The results and recommendations provided below are specific to Site 5.

1985 NEESA – IAS of NCBC Gulfport – This report identified and assessed NCBC sites posing a potential threat to human health and the environment. Among the sites identified, Site 5 was recommended to be further investigated. The IAS included the following:

- A records search
- On-site survey, including geophysics to define site boundaries
- Site ranking
- Outline for Confirmation Study

1987 HLA Confirmation Study – To confirm the information obtained during the IAS, this study included collection of surface water, groundwater, and soil samples at locations on the southern and western sides of Site 5. However, the study assumed that surface water and groundwater flowed south. This assumption was incorrect, resulting in up- or cross-gradient groundwater samples that yielded no contaminants in excess of action levels at that time.

1997 Morris-Knudsen – Direct-push technology (DPT) sampling of soil and groundwater was conducted near magnetic anomalies identified during a geophysical investigation. Arsenic was detected in excess of Tier 1 Risk Screening Levels for soil, and low levels of dioxins and furans were detected, but no tetrachlorodibenzo-dioxin, a byproduct contaminant of Herbicide Orange (HO) was detected.

1997 ABB-ES – Surface Water and Sediment Dioxin Delineation Report – This was a comprehensive study regarding drainage systems at NCBC that could be related to another site (Site 8) and HO storage. Additionally, one of the main purposes of the study was to verify if active landfills during the period of HO storage, such as Site 5, received any HO drums. Surface water, sediment, seep, and groundwater samples were collected from the ditches in and around Site 5. Dioxins were detected at concentrations ranging from 39.1 parts per quadrillion (ppq) to 42 ppq in water samples. In addition, several volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) were detected at levels less than Maximum Contaminant Levels (MCLs) or risk-based concentration values (RBCVs). Groundwater potentiometric surface maps indicated

that groundwater generally flowed to the northwest, and not to the south as had been previously assumed.

1999 HLA – Groundwater Monitoring Report – This report was a more in-depth study of groundwater conditions at Site 5, with a focus on the potential for dioxins and furans. Dioxin levels at the southern end of the site were as high as 80 ppq, significantly greater than the MCL of 30 ppq. Dioxin levels in several other wells in the area were also greater than the dioxin MCL, and it was recommended that a complete delineation of the dioxin plume be completed. Additionally, in one sample, benzene was detected off site at a concentration [6 parts per billion (ppb)] greater than the MCL, and two other chemicals, 1,4 dichlorobenzene and total naphthalene, were detected at concentrations (1 ppb and 20 ppb, respectively) greater than USEPA Region 3 RBCVs.

2007 TtNUS – Draft RI Report – A RI was performed from 2001 through 2007 to further delineate the nature and extent of soil, groundwater, surface water, and sediment contamination at Site 5 and to characterize risks to human health and the environment.

2008 TtNUS – FS – An FS was completed in 2008 that evaluated alternatives to address the contaminated media (soil and groundwater) and COCs (dioxins, arsenic, and benzo(a)anthracene). Based on the USEPA presumptive remedy guidance for landfills, technologies and process options were screened, and two alternatives were developed and compared to the nine CERCLA evaluation criteria.

2008 TtNUS – Proposed Plan – Based on the FS, a preferred alternative was presented to the community and regulators through the Proposed Plan. The preferred alternative for addressing unacceptable risks at Site 5 includes Cap, Ditch Lining, LUCs, and Monitoring.

4.0 SITE RISKS

Based on historical patterns of remedy selection for common categories of sites such as landfills, the USEPA encourages the selection of presumptive remedies (1993a) to increase consistency in remedy selection and to streamline the investigative process. Following the Groundwater Monitoring Evaluation Study (HLA, 1998), it was determined that a presumptive remedy for Site 5 was the best course of action based on the characteristics of the materials in the landfill and the low concentrations of contaminants reported in the surficial aquifer. A containment remedy incorporating a low-permeability cover was considered to be the overall site strategy most consistent with USEPA guidance (1993a) and Presumptive Remedy for CERCLA Municipal Landfill Sites (USEPA, 1993b), amended by the Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills, (USEPA, 1996), as well as MDEQ policy requiring a final cover (containment) for this category of landfill.

Additionally, a Baseline Site Conceptual Exposure Model (shown as Figure 4-1) identified potentially complete exposure pathways in soil, surface water, and groundwater to receptor populations. Therefore, a baseline risk assessment was conducted for both human health and ecological receptors.

The human health risk assessment (HHRA) indicated potential adverse health effects associated with future residential use of groundwater, particularly with regard to exposure to dioxins and arsenic. However, there is considerable uncertainty in the risks calculated for groundwater exposure, and the numerical risk results are likely overestimated. Uncertainties include the fact that no drinking water wells are currently located downgradient of Site 5, groundwater concentrations of arsenic and dioxins/furans are less then their MCLs, and no chemicals in soil, groundwater, surface water, or sediment were eliminated as chemicals of potential concern based on comparison to background levels because neither facility nor site-specific background data were available. However, dioxins and arsenic were retained as COCs.

Exposure to the solid waste disposed in the landfill could pose a threat to human health. Therefore, the waste at Site 5 will also be addressed by the remedial action. Finally, comprehensive ecological investigations did not detect any chemical at concentrations high enough to be considered of potential concern to ecological receptors.

Tables 4-1 through 4-3 summarize the analytical results, MDEQ Tier 1 Target Remediation Goals (TRGs) and Ecological Screening Values (ESVs) by medium for dioxins, arsenic, and BaA, respectively (TtNUS, 2008b). The information was taken from the Final RI. Figure 4-2 presents the surface soil sample results greater than or equal to unrestricted Tier I TRGs. Figure 4-3 presents the subsurface soil sample results

greater than restricted and unrestricted Tier I TRGs. Figure 4-4 presents the groundwater sample results greater than Tier I TRGs. Figure 4-5 presents the sediment sample results greater than restricted and unrestricted Tier I TRGs.

It should be noted that based on discussions between the Navy, MDEQ, and USEPA, it was agreed that the Preliminary Remediation Goals (PRGs) for Site 5 would be State of Mississippi TRGs. As a result, TRGs will serve as the basis for remedial action. Also, for ecological receptors, it was agreed that USEPA Region 4 Biological Technical Assistance Group ecological receptor screening concentration values would be used.

Table 4-1

Summary of Analytical Results, Tier 1 TRGs, and ESVs for Dioxins
Site 5 Decision Document
NCBC Gulfport
Gulfport, Mississippi

Medium	Frequency of Detections	Range	Tier 1 TRG Restricted	Tier 1 TRG Unrestricted	Ecological Screening Value
Surface Soil (ng/kg)	5/9	1.2 - 8.69	38.2	4.26	No criterion
Subsurface Soil (ng/kg)	19/19	0.0357 - 18.5716	38.2	4.26	No criterion
Sediment (ng/kg)	5/5	0.8604 - 6.8275	No criterion		2.5
Groundwater (pg/L)	51/79	0.02 - 17.7	NA	0.446	No criterion

Dioxins concentrations refer to Toxicity Equivalency Quotients (TEQs).
ng/kg = Nanograms per kilogram.
pg/L = Picograms per liter.
ESV = USEPA Region 4 ESVs.
NA = Not applicable

Table 4-2

Summary of Analytical Results, Tier 1 TRGs, and ESVs for Arsenic
Site 5 Decision Document
NCBC Gulfport
Gulfport, Mississippi

Medium	Frequency of Detections	Range	Tier 1 TRG Restricted	Tier 1 TRG Unrestricted	Ecological Screening Value
Surface Soil (mg/kg)	10/10	0.66 – 1.6	3.82	0.426	10
Subsurface Soil (mg/kg)	26/28	0.43 - 3.7	3.82	0.426	10
Sediment (mg/kg)	5/5	0.72 – 6.9	9.8*		7.24

mg/kg = Milligrams per kilogram.
ESV = USEPA Region 4 ESVs.
*USEPA Region 3 Risk-Based Concentration (RBC) Table, October 2002.

Table 4-3

Summary of Analytical Results, Tier 1 TRGs, and ESVs for Benzo(a)Anthracene
Site 5 Decision Document
NCBC Gulfport
Gulfport, Mississippi

Medium	Frequency of Detections	Range	Tier 1 TRG Groundwater	Ecological Screening Value
Groundwater (µg/L)	5/83	0.031 – 0.12	0.0917	No criteria

µg/L = Micrograms per liter.
ESV = USEPA Region 4 ESVs.

The FS (TtNUS, 2008d) presented alternatives to eliminate or reduce human health and ecological risks from dioxins, arsenic, and BaA in soil, sediment, and groundwater through containment, monitoring, and LUCs. The preferred alternative will eliminate the potential for unacceptable risks to human health by containment and preventing exposure to the contaminated media.

Worksheet

Baseline Site Conceptual Exposure Model (SCEM)

Site Name: **Site 5, Heavy Equipment Training Area Landfill**
Site Location: **NCBC Gulfport, Mississippi**

Completed By: **R. Fisher**
Revision Date: **12/19/2006**

☐ Complete ○ Potentially Complete ☐ Draft ■ Final

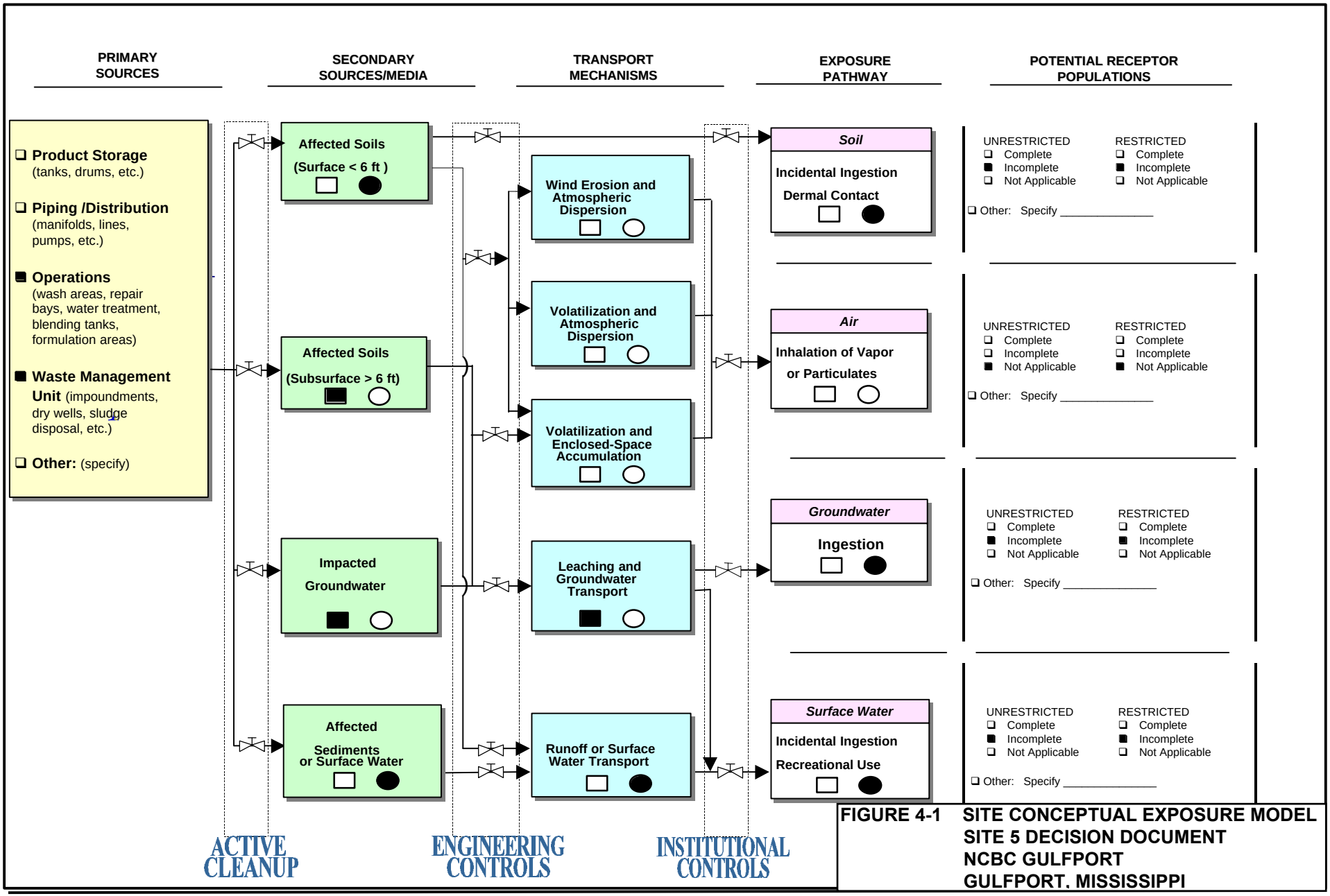

FIGURE 4-1 SITE CONCEPTUAL EXPOSURE MODEL
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

→ = *Potential pathway*

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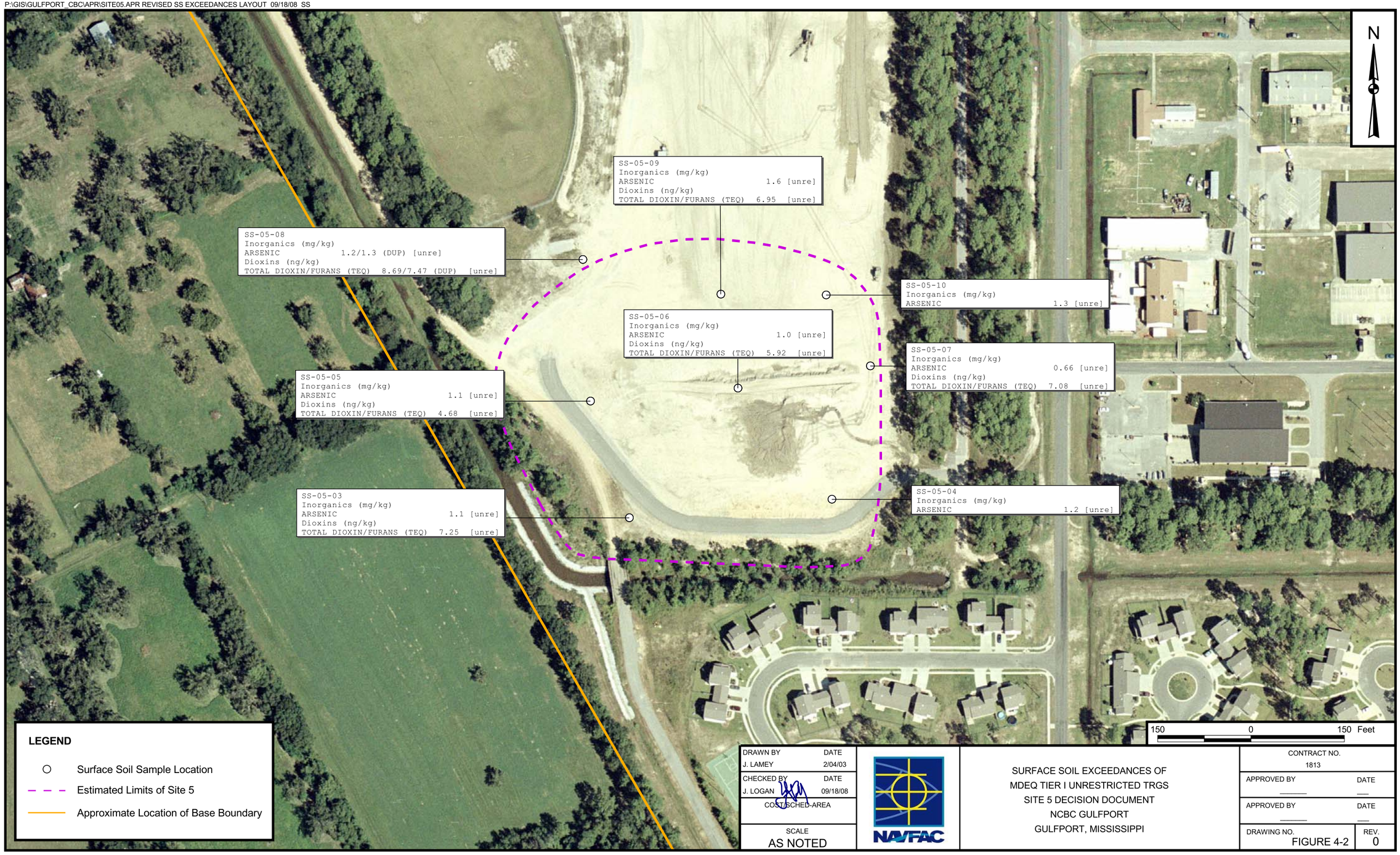

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CHECKED BY	DATE
J. LOGAN	09/18/08
COST/SCHED-AREA	
SCALE	AS NOTED

NAVFAC

SURFACE SOIL EXCEEDANCES OF
MDEQ TIER I UNRESTRICTED TRGS
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	1813
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FIGURE 4-2	0

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N

DP-05-17
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.8	[3.82]	[0.43]*

A3-2
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	2.2	(3.82)	(0.43) *

DP-05-16
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.44	[3.82]	[0.43]*

A2-3
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	2.6	(3.82)	(0.43) *

A5-3
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	2	(3.82)	(0.43) *

A2-2
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.2	(3.82)	(0.43) *

A5-4
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.79	(3.82)	(0.43) *

A5-2
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.3	(3.82)	(0.43) *

DP-05-14
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.94	[3.82]	[0.43]*

Dioxins (ng/kg)

		RES	UNRES
TEQ	10.88	[38.20]	[4.26]*

DP-05-14 (DUP)
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.6	[3.82]	[0.43]*

A1-2
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.7	(3.82)	(0.43) *

A1-1
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.3	(3.82)	(0.43) *

DP-05-07
Semivolatile Organics (ug/kg)

		RES	UNRES
BENZO(A)PYRENE	360	[784.00]	[87.50]*

Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.72	[3.82]	[0.43]*

Dioxins (ng/kg)

		RES	UNRES
TEQ	7.14	[38.20]	[4.26]*

A5-5
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	2	(3.82)	(0.43) *

A3-3
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.3	(3.82)	(0.43) *

DP-05-13
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.2	[3.82]	[0.43]*

A6-6
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.4	(3.82)	(0.43) *

DP-05-12
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.1	[3.82]	[0.43]*

DP-05-08
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.89	[3.82]	[0.43]*

Dioxins (ng/kg)

		RES	UNRES
TEQ	18.57	[38.20]	[4.26]*

DP-05-08 (DUP)
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.6	[3.82]	[0.43]*

Dioxins (ng/kg)

		RES	UNRES
TEQ	10.99	[38.20]	[4.26]*

A6-5
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	4.3	(3.82)	(0.43) *

DP-05-11
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.90	[3.82]	[0.43]*

DP-05-18
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.64	[3.82]	[0.43]*

DP-05-10
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.2 J	[3.82]	[0.43]*

A6-4
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.85	(3.82)	(0.43) *

DP-05-01
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.99	[3.82]	[0.43]*

DP-05-09
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.68	[3.82]	[0.43]*

DP-05-02
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.80	[3.82]	[0.43]*

A6-3
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.5	(3.82)	(0.43) *

A6-1
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.4	(3.82)	(0.43) *

DPO-05-02
Inorganics (mg/kg)

		RES	UNRES
ARSENIC (10 - 12')	3.7	[3.82]	[0.43]*
ARSENIC (18 - 20')	1.5	[3.82]	[0.43]*
ARSENIC (28 - 30')	0.63	[3.82]	[0.43]*

DP-05-19
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.43	[3.82]	[0.43]*

A9-4
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1	(3.82)	(0.43) *

DPO-05-03
Inorganics (mg/kg)

		RES	UNRES
ARSENIC (10 - 12')	1.9	[3.82]	[0.43]*
ARSENIC (18 - 20')	0.87	[3.82]	[0.43]*
ARSENIC (28 - 30')	0.60	[3.82]	[0.43]*

A9-1
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.2	(3.82)	(0.43) *

DP-05-05
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	2.2	[3.82]	[0.43]*

DPO-05-01
Inorganics (mg/kg)

		RES	UNRES
ARSENIC (10 - 12')	0.44	[3.82]	[0.43]*
ARSENIC (18 - 20')	0.74	[3.82]	[0.43]*
ARSENIC (28 - 30')	2.8	[3.82]	[0.43]*

A9-3
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	2.1	(3.82)	(0.43) *

DP-05-03
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.1	[3.82]	[0.43]*

A9-2
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1	(3.82)	(0.43) *

A6-2
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	1.8	(3.82)	(0.43) *

Dioxins (ng/kg)

		RES	UNRES
TEQ	10.49	(38.2)	(4.26) *

DP-05-04
Inorganics (mg/kg)

		RES	UNRES
ARSENIC	0.43	[3.82]	[0.43]*

A
A'
B
B'
EARTHEN MOUND
A1-3
A5-1
A3-1
A2-1
A10-1
A10-2
A9-5
A6-1
A6-2
A6-3
A6-4
A6-5
A6-6
R5001
R5002
R5003
R5004
R5005
R5006
R5007
R5008
R5009
R5010
R5011
R5012
R5013
R5014
R5015
R5016
R5017
DP-05-01
DP-05-02
DP-05-03
DP-05-04
DP-05-05
DP-05-06
DP-05-08
DP-05-09
DP-05-10
DP-05-11
DP-05-12
DP-05-14
DP-05-15
DP-05-16
DP-05-17
DP-05-18
DPO-05-02
DPO-05-03

LEGEND

- Sample Location, Phase 1 - 1997
- Sample Location, Phase 2 - 1999
- Sample Location, Phase 3 - 2001
- RES [3.82] — Restricted Tier I Value
- UNRES [0.43] — Unrestricted Tier I Value
- Estimated Limits of Site 5
- Approximate Location of Base Boundary
- Geophysical Anomalies from Magnetic Anomalies

An * indicates that the detected concentration exceeded Tier I TRG.

Aerial Photo, 2005.

150 0 150 Feet

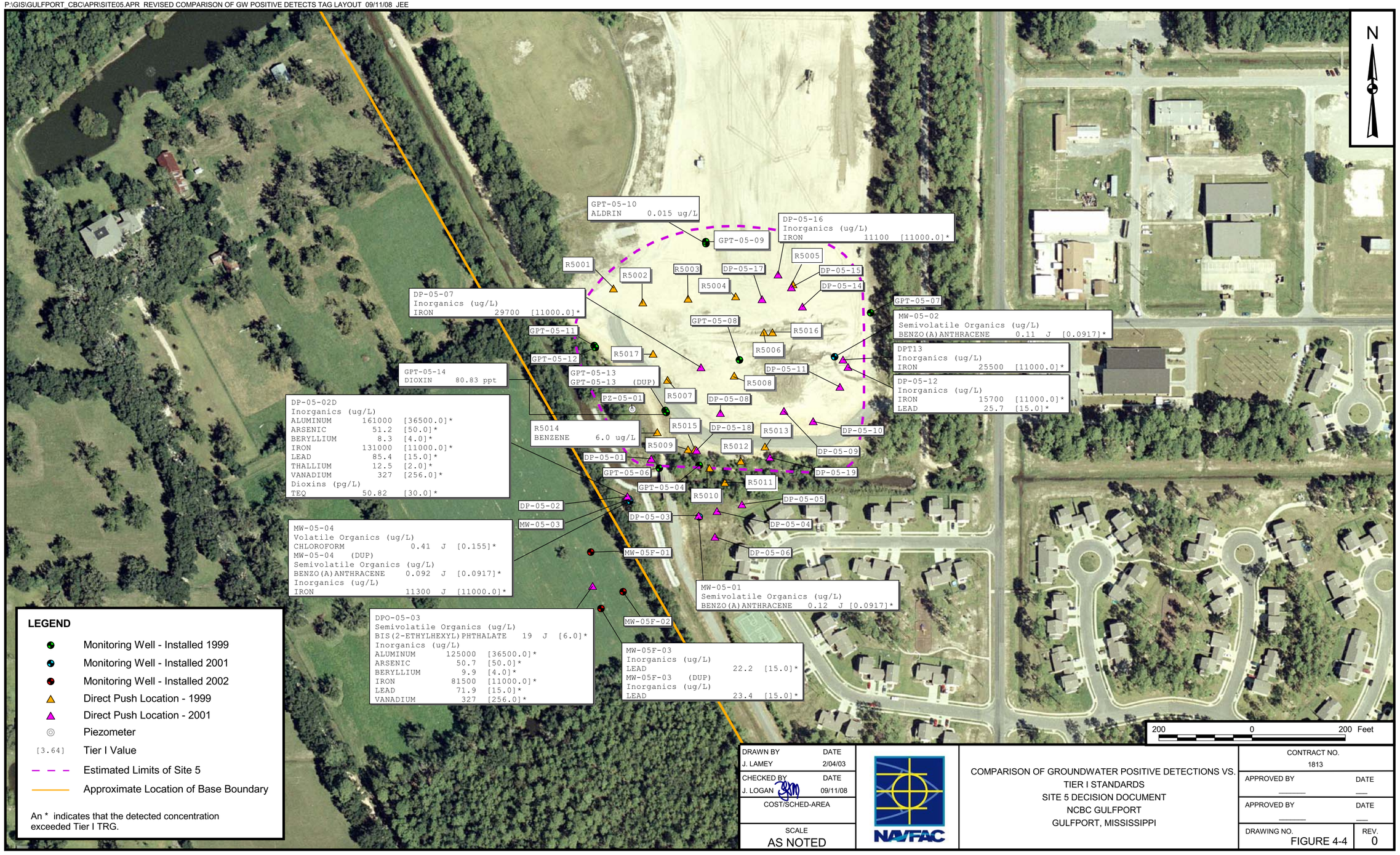
DRAWN BY	DATE
S.STROZ	12/18/06
CHECKED BY	DATE
J. LOGAN	09/11/08
COST/SCHED-AREA	
SCALE	AS NOTED

NAVFAC

SUBSURFACE SOIL EXCEEDANCES OF
RESTRICTED AND UNRESTRICTED TIER I TRGs
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
1813	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 4-3	0

P:\GIS\GULFPORT_CBC\APR\SITE05.APR REVISED COMPARISON OF GW POSITIVE DETECTS TAG LAYOUT 09/11/08 JEE



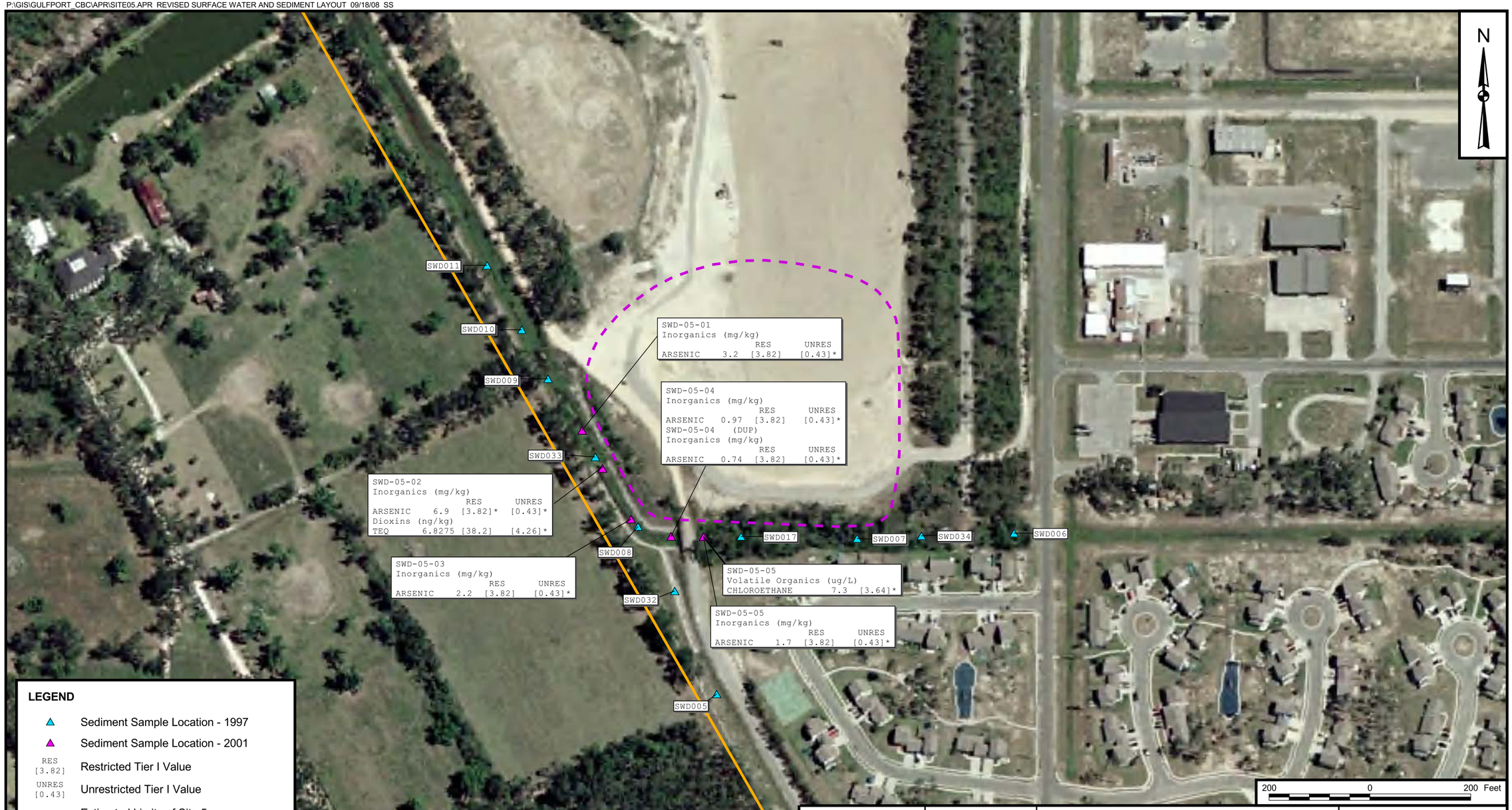
DRAWN BY	DATE
J. LAMEY	2/04/03
CHECKED BY	DATE
J. LOGAN	09/11/08
COST/SCHED-AREA	
SCALE	AS NOTED

NAVFAC

COMPARISON OF GROUNDWATER POSITIVE DETECTIONS VS. TIER I STANDARDS
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	1813
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 4-4	0

P:\GIS\GULFPORT_CBC\APR\SITE05.APR REVISED SURFACE WATER AND SEDIMENT LAYOUT 09/18/08 SS



DRAWN BY	DATE
S. STROZ	5/22/08
CHECKED BY	DATE
J. LOGAN	09/18/08
COST/SCHED-AREA	
SCALE	AS NOTED

NAVFAC

SURFACE WATER AND SEDIMENT EXCEEDANCES OF
RESTRICTED AND UNRESTRICTED TIER I TRGs
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	1813
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	FIGURE 4-5
REV.	0

5.0 REMEDIAL ALTERNATIVES

After an extensive investigation of the site and in-depth evaluation of the sampling data, the following RAOs were determined based on the COCs, dioxins, BaA, and arsenic, for Site 5:

- **RAO 1:** Prevent direct exposure to contaminated soil and waste disposed at Site 5, therefore eliminating unacceptable human exposure to those contents.
- **RAO 2:** Reduce the migration of contaminants to groundwater.
- **RAO 3:** Prevent residential exposure to and consumption of groundwater.
- **RAO 4:** Comply with federal and state legal requirements and guidelines, referred to as Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBC) guidelines.

In the technology screening process in the FS (TtNUS, 2008d), Excavation and Off-site Disposal and Excavation with On-site Treatment and Disposal were evaluated, but were eliminated because of high capital costs. Using the presumptive remedy for landfills approach, only two alternatives (Alternative 1 – No Action, and Alternative 2 – Cap, Ditch Lining, LUCs, and Monitoring) were developed to address the RAOs, and these alternatives were evaluated against the nine criteria as described in CERCLA. The comparative analysis of alternatives as presented in the FS is summarized in Table 5-1.

After analysis and consideration of the nine CERCLA evaluation criteria, the selected remedy consists of capping the landfill, excavating soil and sediment to install a grouted riprap cover, LUCs, and monitoring. The selected alternative, shown on Figure 5-1, is a compilation of various remedial technologies including excavation, containment, and monitoring, as described below:

- The landfill will be contained by a low-permeability cap system, and the ditch will be lined with grouted riprap to complete the containment system.
- The area to be disturbed will be cleared and grubbed. The existing ground surface will be graded and sloped as needed to promote runoff.
- Landfill gas will be vented through a series of vents.
- Sediment (i.e., fine-grained organic muck) that has accumulated in the drainage channel will be removed down to the existing grouted riprap surface where present or to the firmer fine-grained sand. The sediment will be placed within the limits of the landfill beneath the final cover system.
- LUCs will be developed to allow for recreational uses of the site and prevent residential development, digging, and groundwater use. Physical restrictions to the site may include signage and fencing.
- Groundwater will be monitored periodically for arsenic, dioxins/furans, and BaA.

Detailed information about the design can be found in the 90% Remedial Design for Site 5 (TtNUS, 2008c).

TABLE 5-1

SUMMARY OF COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES
SITE 5 DECISION DOCUMENT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

Evaluation Criterion	Alternative 1: No Action Alternative	Alternative 2: Cap, Ditch Lining, LUCs, and Monitoring
Overall Protection of Human Health and Environment	Not protective	Protective
Compliance with ARARs and TBCs • Chemical-Specific • Location-Specific • Action-Specific	 Would not comply Would not comply Not applicable	 Would comply Would comply Would comply
Long-Term Effectiveness and Permanence	Not effective	Effective
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	None	None
Short-Term Effectiveness	No relevant issues to address	Would be effective. However, there is potential for short-term risks to site workers during construction and monitoring. In 1 year, the RAOs would be achieved.
Implementability	Nothing to implement	More difficult to implement than Alternative 1.
Costs: • Capital • NPW of O&M • NPW	 $0 $0 $0	 $3,722,000 $765,000 $4,487,000
State/Support Agency Acceptance	Unacceptable risks would remain at the site; therefore, MDEQ would not accept this alternative.	MDEQ has accepted the preferred remedial alternative.
Community Acceptance	No formal comments were received when the preferred alternative was presented to the community.	No formal comments were received when the preferred alternative was presented to the community.

LUCs – Land use controls.
NPW – Net present worth.
O&M – Operation and maintenance.
RAO – Remedial Action Objective.
TBC – To Be Considered.
ARAR - Applicable or Relevant and Appropriate Requirement.
MDEQ – Mississippi Department of Environmental Quality

ACAD:18130M09.dwg 09/18/08 CK PIT

CONTINUE TO EXISTING FENCE

NEW FENCE

GPT-05-9

GPT-05-10

ESTIMATED LIMIT OF SITE 5

CAP

GPT-05-07

ASPHALT ROAD (20'-3" WIDE)

COLBY AVENUE

FOURTH STREET

N

EXTENT OF LINING

INSTALL NEW GRAVEL ROAD AFTER CAP INSTALLATION

DIRT ROAD 15'-0" WIDE)

GPT-05-11

GPT-05-12

GPT-05-08

MW-05-02

RELOCATE

DREDGE BOTTOM SEDIMENT AND LINE DITCH WITH GROUTED RIPRAP

CHAIN LINK FENCE WITH BARBED WIRE - PERIMETER FENCE (APPROXIMATE BASE BOUNDARY)

GPT-05-13

GPT-05-14

PZ-05-01

REMOVE EXISTING ASPHALT ROAD WITHIN EXTENT OF CAP

(2) 24" RCP'S

RELOCATE

ASPHALT ROAD (24'-6" WIDE)

CONC. HEADWALL

GPT-05-04

OPEN DRAINAGE DITCH

PRIVATE PROPERTY
(DR. GADDY)
52 ACRES

BRIDGE TO BE REPLACED BY OTHERS

EXTENT OF LINING

DREDGE BOTTOM SEDIMENT AND LINE DITCH WITH GROUTED RIPRAP

ASPHALT ROAD (20'-6" WIDE)

RESIDENTIAL 4'-0" CHAIN LINK FENCE (TYPICAL)

OPEN DRAINAGE DITCH

RIP RAP HIGHBANK

LEGEND:

- WELL TO BE SAMPLED FOR LONG-TERM MONITORING
- NEW WELL TO BE SAMPLED FOR LONG-TERM MONITORING
- WELL TO BE ABANDONED
- FLOW DIRECTION
- UTILITY POLE
- FENCE

0 100 200

GRAPHIC SCALE IN FEET

DRAWN BY CK	DATE 9/18/08
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	

NAVFAC

REMEDIAL ACTION
SITE 5 DECISION DOCUMENT
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

CONTRACT NO. 1813	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 5-1	REV. 0

FORM CADD NO. SDIV-BH.DWG – REV 1 – 9/10/98

6.0 COMMUNITY INVOLVEMENT

The Proposed Plan for Site 5 was made available to the public on May 13, 2008 and along with other site-related reports and documents can be found in the Administrative Record File maintained at the Gulfport Library (47 Maples Drive #1, Gulfport, MS 39503, Telephone (228) 871-7171). Also, on May 13, 2008, a public meeting was held at the Crystal Inn in Gulfport, and a public comment period was provided from May 13 through June 13, 2008. The meeting included a presentation of the Proposed Plan that summarized the findings and the preferred alternative to address the unacceptable risks at Site 5. The transcript of this presentation has been included in Appendix A

Formal comments related to a document such as a Proposed Plan that are received during the public comment period and the Navy responses to these comments are usually presented in a Responsiveness Summary Section. However, no formal comments were received related to the Proposed Plan for Site 5.

7.0 DECLARATION

The response that will be conducted at Site 5, as described in this Decision Document, is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

7.1 DESCRIPTION OF THE CHOSEN REMEDIAL ACTION

The chosen remedial action alternative will adequately protect human health and the environment, attain all federal and state requirements (including ARARs and TBCs), is cost effective, feasibly implementable, and long-term effective. This alternative includes capping, ditch lining, LUCs, and monitoring and follows USEPA presumptive remedy guidance for landfills. Additionally, after the remedy is implemented, the site will be available for recreational uses. The landfill will be contained by a low-permeability cap system, and the ditch will be lined with grouted riprap. The existing ground surface will be graded and sloped as needed to promote runoff. A landfill gas venting system will be installed. The sediment that has accumulated in the drainage channel will be removed and placed within the limits of the landfill beneath the final cover system. LUCs will be developed to allow for recreational uses and prevent residential development, digging, and groundwater use. Physical restrictions to the site may include signage and fencing. Groundwater will be monitored periodically for arsenic, dioxins/furans, and BaA.

7.2 STATUTORY DETERMINATION

This remedial action has been determined to be protective of human health and the environment and it complies with federal and state requirements that are legally applicable or relevant and appropriate to the removal action. It has been further determined that the remedial action will eliminate or minimize human health or ecological exposures to the primary sources of contamination, and groundwater long-term monitoring (LTM) will be conducted to verify the effectiveness of the remedy.

7.3 ADMINISTRATIVE RECORD CHECKLIST

The following information for Site 5 is included in the environmental library at NCBC for public review:

- COCs and their respective concentrations
- Established cleanup levels (Tier 1 TRGs)
- Source documents associated with all previous investigations and sampling events
- Key factors that lead to the selection of the remedial action

8.0 LONG-TERM MONITORING REQUIREMENTS

8.1 GROUNDWATER

LTM at Site 5 is included as part of the remedy due to the presence of contaminants in site soil and groundwater. An LTM Plan, subject to review and comment by MDEQ, will be prepared to describe the details of this component of the remedial action.

Specifically, the LTM Plan for Site 5 will include the following:

- Collection and analysis of groundwater samples from each of the five monitoring wells surrounding the capping area at Site 5, as shown on Figure 5-1. The sampling intervals will be quarterly (baseline) for the first year, semi-annually for 2 more years, and annually thereafter until MDEQ agrees that the contaminant concentrations have stabilized and no migration is occurring.
- The analyte list for Site 5 includes arsenic, dioxins/furans, and BaA because these are the Site 5 COCs in soil and/or groundwater.

Reports will be prepared at the end of each sampling event and will include all of the monitoring data generated during the event. In addition, long-term trends will be presented and potential modifications to the monitoring plan will be recommended.

It is assumed that if concentrations of COCs are less than MDEQ Tier 1 TRG levels for two consecutive monitoring periods, the Navy will formally submit a request to MDEQ that the conditions have been met to cease regular groundwater monitoring.

8.2 LANDFILL GAS

Monitoring of the methane concentration in the landfill gas in perimeter soil gas monitoring wells will be performed quarterly as part of the landfill cap operation and maintenance O&M program.

9.0 APPROVAL AND SIGNATURE

Pursuant to Section 104 of CERCLA, the President is authorized to undertake actions in response to a threat or potential threat to human health, welfare, or the environment. This authority was delegated to the Administrator of the USEPA, then to the Regional Administrators, and through other delegations, the Department of Defense via Naval Facilities Engineering Command Southeast is now authorized to approve these actions.

_____ _____

E. W. BROWN Date

COMMANDING OFFICER

NAVAL CONSTRUCTION BATTALION CENTER

REFERENCES

TtNUS (Tetra Tech NUS, Inc.), 2007. Draft Remedial Investigation, Site 5, Heavy Equipment Training Area Landfill at Naval Construction Battalion Center, Gulfport, Mississippi. Prepared for Southern Division Naval Facilities Engineering Command, North Charleston, South Carolina. June.

TtNUS, 2008a. Proposed Plan for Site 5 - Heavy Equipment Training Area Landfill at Naval Construction Battalion Center Gulfport, Gulfport, Mississippi. Prepared for Southern Division Naval Facilities Engineering Command Southeast, North Charleston, South Carolina. May.

TtNUS, 2008b. Final Remedial Investigation, Site 5 - Heavy Equipment Training Area Landfill at Naval Construction Battalion Center, Gulfport, Mississippi. Prepared for Southern Division Naval Facilities Engineering Command Southeast, North Charleston, South Carolina. June.

TtNUS, 2008c. (Draft) 90% Remedial Design, Site 5 - Heavy Equipment Training Area, Naval Construction Battalion Center, Gulfport, Mississippi. Prepared for Southern Division Naval Facilities Engineering Command Southeast, North Charleston, South Carolina. September.

TtNUS, 2008d. Final Feasibility Study, Site 5 - Heavy Equipment Training Area Landfill at Naval Construction Battalion Center, Gulfport, Mississippi. Prepared for Southern Division Naval Facilities Engineering Command Southeast, Jacksonville, Florida. August.

USEPA (United States Environmental Protection Agency), 1993a. Presumptive Remedies: Policies and Procedures, OSWER Directive No. 9355.0-47FS. September

USEPA, 1993b. Presumptive Remedy for CERCLA Municipal Landfill Sites. EPA 540-F-93-035, Office of Solid Waste and Emergency Response, Washington D.C.

USEPA, 1996. Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills (Interim Guidance). EPA-540-5-96-007, Office of Solid Waste and Emergency Response, Washington, D.C.

APPENDIX A

PROPOSED PLAN PRESENTATION TRANSCRIPT
MAY 13, 2008

* * * * * * * * * * * * * * * * * *
*
NCBC GULFPORT PUBLIC MEETING *
*
CTO 292, SITE 5 *
*
HEAVY EQUIPMENT TRAINING *
*
AREA LANDFILL *
*
* * * * * * * * * * * * * * * * * *

The public meeting was held at the Crystal Inn, Gulfport, Mississippi on the 13th day of May 2008, commencing at approximately 7:00 p.m.

A P P E A R A N C E S

INTRODUCTIONS:

ART CONRAD
NANCY ROUSE

SITE 5 PROPOSED PLAN:

ROBERT FISHER
JOE LOGAN

Q & A:

ROBERT FISHER
JOE LOGAN

ALISA MARIE DORILMA, CSR-1792
COURT REPORTER

ALSO PRESENT:

CHARLES REESE, VIDEOGRAPHER

MR. CONRAD:

I'm Art Conrad. I work for the Navy, and we're here to present a proposed plan for Site 5 on base. It's a called a heavy equipment training area landfill. It was a landfill that received refuse from the base and trenches. And trenches were covered. And then about 6 or 8 feet of sand was put on top of the whole site and then the base used the area for crane training, forklift training and bulldozer training so that's where the name came from.

But Bob Fisher is gonna go over what we propose to do the cleanup for the site and this will start the comment period for the community if you have concerns about what we are doing, you could identify your concerns. We can talk about -- we can have a discussion about anything to do with the site, but the specific concerns need to be identified in writing so listen to the discussion and, you know, then voice your concerns. But then, if you -- if there are things that are not addressed, put them also in writing and then we will respond to your

concern within the 30-day period. And those responses will also be apart of the plan.

Okay. Bob Fisher from Tetra Tech --

MS. ROUSE:

I just have a few comments.

MR. CONRAD:

Okay. Yes. Yes.

MS. ROUSE:

I just have a few comments about how the meeting is set up. Okay. First, I just want you to know there's a court reporter here tonight because it's a public meeting, and also we're videotaping the presenter not the group, and that's just so we get a better transcript. You know, it's really difficult to capture a lot of discussion in a court report like this so we're just doing this to capture as much as we can.

If -- This is Alisa, and if she's not able to hear something that she needs to record, she -- either she or I may ask you to repeat your question or comment. So, again, that's all just to get the best verbatim transcript that we can get.

And then, as Art has said, comments

will be accepted in writing during the public comment period. And we have some forms in the back and there's also a form in the very back of the proposed plan which is the document that's gonna be presented tonight. And you can also present them by e-mail to Gordon Crane.

And then if there are any questions that you have that aren't related to Site 5, please hold those until after we complete the discussion of Site 5 so that we can, again, get a good, clean transcript. We'll be happy to answer any questions you have, but again, until we close that Site 5 part of the meeting, we'd like to hold those comments or questions.

And it is okay to interrupt during -- raise your hand and ask questions or, you know, make a comment about Site 5 during the presentation.

And I think that's pretty much what -- you know, I just wanted to share with you before we start.

MR. FISHER:

All right. My name is Bob Fisher as

Nancy mentioned. I'm actually gonna handle about the first half of the presentation. I'm gonna go over the investigative portion of it. I'll get into the remediation just a little bit so that we can start the discussion, and then I'll hand it over to a Tetra Tech engineer, Joe Logan. He'll go ahead and carry it out from there. So let's get started.

Okay. This is the proposed plan. You have copies of it. It provides environmental information about the site. It summarizes the alternatives that we looked at for completing the site remedial activities and it also explains our recommendations for what we would like to do with the site.

Obviously at this point, the decision is still out there for the public to comment on. And we will certainly take any of those comments into consideration as we take this final.

The public comment period starts tonight and a period of time until June 13th. We will have an interactive

conversation here. We'll have comments and discussions and I may say things in response to those questions, but if we want to get that into the record, it's best to have it in writing because just a question and comment session, some of those will get skipped so please go ahead and fill out those comment cards and we'll respond to those and that'll be part of the record.

The rest of the documents that support what we're doing here tonight are the remedial investigation and feasibility study those are available in the information repository and we can now get copies of those as PDFs if anybody requests those.

Okay. A little bit about the site. Site 5 is a former landfill located in the southwest corner of the Seabee base and I'll have a picture of that here in just a second. It's about six acres -- the site is about six acres large. It's current -- it was used for heavy equipment training. Currently, they are trying to stay off the sandy area that is -- that covers the landfill. It is flat. There's a mound on

the site near the center that was used for forklift training and just driving up and over the mound. As we mentioned, there's very little vegetation. And two of the most important features of the site are the ditches along the south and western sides of the site.

Here it is. This is the site itself within the blue line. We determined that using primarily geophysics. That's an instrument like a metal detector. We go out there and we canvas the site up and down in rows and cover the entire area. We find what was disposed out there because of its signatures with metallic energy that we pick up with the instruments.

What we determined is, this is the edge of the site. We confirmed that using drilling and direct push technology, collecting the soil samples and surface soil sample across this area.

We further studied the ditches by collecting soil and sediment from the ditch and surface water. So the remedial investigation is the -- is the sum total of

all that information that we put into a document. While we've gone into the real detail of that in previous meetings, we're gonna cover some of the highlights of the RI here tonight.

Here's an image of the site looking to the north. This is essentially standing on that earthen mound I discussed. As you see, it's flat, sandy, you have a monitoring well right there, and you can see from some of the -- just scrubby grass growing there, but it's not been a lot of activity on that area which is really what we wanted.

Again, looking a little bit further to the northeast, this is towards a little more industrial areas on the base. Again, that pretty much is the site. This is the sandy cover. The landfill itself is 3 to 4 feet below this sand. It was a trench landfill. This is very common with the military. They did incinerate within those trenches until the whole area was covered over with the fill you see here.

A little more of the history of the site. Was operated for approximately four

years in the early to mid '70s. The waste that were put there were on-base dumpsters, construction debris, general refuse. Some of the liquid waste that we know of are probably some solvent-type waste or fuels. Those were used as accelerants for incineration that happened on a really regular basis.

As I mentioned, after the landfill activities were stopped and the site was covered with sand and then it was used for a number of years for heavy equipment training. Then the guys that were out there doing the equipment training, did push that covered soil around quite a bit. So one of the problems we had was to look at that covered soil as part of the landfill and not a separate unit from it because of the potential for mixing.

History of the investigations. It started in 1987. Initial assessment study. That was the Navy's first look at confirming whether or not the records of landfill and other things like that were true. The 1987 studies confirmed that it was the landfill

we had in the reports. Not a lot of activity was taken between '87 and '97.

Part of the reason for that was, they did an initial set of studies that didn't find any of the contamination that we would find later. Part of that was due to the technology they had available to them at the time. The laboratory they're using now is more extensive. And part of that was, they didn't have a good understanding of the geology. They collected a lot of samples in the areas that we later found out were up-gradient of the site.

We have got a lot more intensive to the site in 1997. What we call the groundwater monitoring report, they've collected a full range of samples from the subsurface and from the ditches around the site.

What we learned from this study in 1997 was that we should continue on in and conduct a remedial investigation. We did that. We initiated the investigation in 2001. We continued into 2002. And when we looked at -- further looked at the surface

soil, we were concerned enough to collect some additional samples in 2006 to make sure we had a good understanding of everything at the surface.

Okay. Next slide. All right. The surface soil concentrations that we're looking at here in the rest of this -- next couple slides, this is going to cover the major findings from the remedial investigation. So when we talk about individual compounds or metals or things like that, these are the major findings from the remedial investigation.

So I'll start with surface soil. Our concern there with surface soil is that it's the way it would be contaminated. That's when people walk across the site, this is the first thing they're gonna come into contact with. It was very important for us to have a good understanding of the surface soil conditions. And secondarily, we needed to know how big of an area we're gonna cover with a landfill cap. And really, the -- while the geophysics told us the extent, we needed to confirm that with actual soil data

and that's what we had here.

When you look at the results of the surface soil, we did see arsenic, and it was above what we would call the residential use numbers but below restricted or industrial numbers.

When we evaluate that, when you see something between residential and industrial, you have to look at the risks of how people would come into contact with it. And since we have residents living adjacent to the site, even though the site itself is industrial, we have residents very close by so we're gonna look at this on more of a residential standard.

We did collect dioxins and furans. And the reason we were looking at dioxins and furans in every reading in here, that means surface soil, sediment, groundwater because that landfill was open at the same time the drums of Herbicide Orange was stored at the Seabee base.

What we found were dioxins and furans above the screening or the residential use standards but less than industrial. Again,

like surface soil and the arsenic we mentioned, we're more concerned about the residential use because of the proximity of the houses.

Once we get to the subsurface, this is soil that's greater than a foot or two deep. We're looking at, again, dioxins and furans. Again, they were less than the restrictive level but above the residential level. What all that tells us is that we need to take action. To leave those there the way it is opens up the site to the potential of exposure. So when you've got a site like Site 5, we're looking at how do we prevent exposure in the future.

When we see the numbers that exceed residential use and we have a residential community nearby, that triggers us early on to start thinking about taking action to prevent that exposure.

When we looked at groundwater, we saw some other concentrations of some other contaminants; benzo anthracene -- the PAH, it was greater than the MDEQ regulatory levels. When we talk about groundwater,

we're talking about one level, and the standard is drinking water. There's no residential or nonresidential standards for groundwater.

Again, with the dioxins and furans, the totals are greater than the drinking water standard. And we found that there were no plumes or groundwater concentration leaving the site or migrating away from the site.

For the ditches around the Site 5, those would be surface water and sediment samples. What we found there were the -- again, with this arsenic in the sediment. We saw dioxins in the sediment that also prompted us to take action here because they were above the screening standards. The surface water we found that was leaving the site, we didn't get contaminants above the regulatory levels.

One of the things that we were looking for, there had been reports of buried drums and other buried metallic debris. We went after -- with the geophysical survey looking for those magnetic signatures of those

drums. Unfortunately even if they were there, the drums are probably old enough to degrade at the subsurface so that survey probably wouldn't have found it, but we went after it anyway just to make sure.

And again, I note on the dioxins and furans, we collected every sample set from every media that had dioxins and furans, collected it and analyzed it. What we found in the site were a lot of these dioxins and furans associated with burning. These are the aqua chlorinated dioxins, the hexa furans (phonetic.) Those types of dioxins and furans are not generally associated with Herbicide Orange although we did find some TCDD, but the TCDD generally was below screening concentrations.

That's a lot to say for a proposed plan and certainly if you have questions, you can ask right now or hold those. We can get into more detail on dioxins and furans or any of those others.

Part of the remedial investigation involves evaluating the concentrations that we find in the samples and determining if

there are risks to both humans and/or the environment. One of the things we look at is the human health risk assessment. It actually calculates that risk.

The State of Mississippi has a standard which is actually more stringent than the USEPA, but we do use USEPA methods to benchmark it against these more stringent MDEQ standards.

And the conclusions we have from risk assessment were that groundwater would not be suitable for drinking water which we pretty much knew from the earlier samples. And the contaminants with the highest potential risk to people were the arsenic, those dioxins and furans and again the PAHs.

The ecological risk assessment looked at the same data but from the perspective of the environment meaning with animals and plants that would be there. The concentration did exceed some of the screening concentrations of ECO but the -- to be a risk, you have the receptors there so the plants and animals that might be impacted by some of these concentrations

just were not at that site so the ecological risk assessment determined them not to be of a high risk. In fact, what this tells you here -- this information tells us that the actions taken were based on human risk and not ecological risk.

Okay. The approach to what we're doing here. For common types of sites, as I said, the USEPA standardized the approach for cleaning up some of these sites. One of these kind of standardized approaches is for an old landfill like this one. And this area, they call these presumptive remedies. And the reason they have these is so that we don't keep trying to reinvent the wheel each time we are investigating the site like Site 5, and they have certain standards they want you to -- and certain processes to follow.

When you look at a presumptive remedy for a landfill to be consistent with other sites that have been accepted, we're looking at a type of cover that will prevent exposure while limiting infiltration of water and preventing exposure to any of the contaminants. And when we look at this type

of site, municipal-type landfill or a nonmilitary landfill because we did not have any radioactive waste or things that might be exclusions for using this presumptive approach.

Again, with the presumptive remedy for a municipal landfill. We're looking at a cover. The cover provides a barrier to access to the site. It prevents exposure to contaminants within the site. The rainfall that passes over the landfill will no longer infiltrate into the contaminants, and that prevents the contaminants from migrating away from the site to potentially become a problem later on either through surface water or migrating through groundwater.

One of the other things that we have to always look out for with landfills is the gases. When we looked at Site 5, we did find methane and we did find some hydrogen sulfide. They weren't in very high concentrations, but it's certainly enough that if you put a cap, you think of it like putting a plastic bag over the site, you could trap those gases eventually to create

a hazard.

So when we looked at those gases, we decided that a venting system would also be part of our actions to prevent the buildup of those gases and potential hazards from coming back.

So from that point, I think it's probably a good spot to stop and see if there are any questions about the investigation.

At this point, we're gonna turn it over to Joe and he's gonna talk about the specifics of the cap and how that's gonna take place.

So if not, I'll turn it over to you, Joe.

MR. LOGAN:

Thanks, Bob, for that.

My name is Joe Logan. I'm an engineer from the Tetra Tech Pittsburgh office and I've been working on the feasibility study and that's the part I want to go over now.

The first step of the feasibility study is putting together what's referred to as remedial action objectives. And in this

particular case and as it applies to presumptive remedy to prevent unacceptable human health risk following a remedial action objectives were identified. One, prevent direct exposure to contaminated soil and waste disposal at Site 5, therefore, eliminating unacceptable human exposure to the contents.

Number 2 is to reduce the movement of contaminants into the groundwater. Number 3, prevent residential use of the groundwater, and Number 4, comply with federal and state legal requirements and guidelines referred to as applicable and relevant and appropriate requirements or ARARs. And those are the basic regulations in this particular case for groundwater quality, soil quality and also how to close the landfill.

Next one please. By using this presumptive remedy approach, the number of alternatives -- the whole family of remedial -- that need to be evaluated for feasibility studies, reduced it significantly at other sites, say, a nonlandfill site, many more

different approaches might be considered, different cleanups, different technologies, different processes whereas a landfill and especially the one typical -- that received typical municipal-type wastes. There's really just two alternatives that were really worth considering. One is the no-action alternative which is just part of the process that all the other alternatives were compared to. And the second and combined alternative is a cap and then lining the ditch that you saw earlier in the picture; land use controls to restrict the type of activities that's gonna take place at the site; and then finally monitoring. Monitoring groundwater; monitoring of gases that can come out.

Next please. Now, the first alternative is simply no action, and it's always used as the baseline for comparison. And this alternative is part of the superfund process, and that's why all alternatives are -- all our feasibility studies have this first alternative. And it basically assumes that no changes would be

made at the existing conditions at the site. There will be no monitoring, no cover, no inspection.

Okay. Next one. Alternative 2, though, is the -- again, the approach that is best for and typical for a landfill. The first is a waste containment with a cap. The cap would be designed to meet the Mississippi DEQ landfill regulations. It would prevent direct contact with contaminated surface. It would minimize rain passing through the soil and through the waste and into the groundwater. And it also prevents contaminants from the landfill from eroding into the ditch.

For this particular site, the final cover would be grass cover and the Navy plans to use it for recreational activities. Still hasn't said yet if it may be -- currently they're looking to include it as part of the driving range.

The next one, please. In addition and as part of this, some of the sediment that was found to be contaminated along the sides of ditch and at the bottom of the ditch that

would be excavated, removed, put on the landfill, and to reinforce the sides of the ditch, it would be lined with a grouted rock. And then the surface water and sediment control -- in other words, to keep more of the sediment from getting in it provided by capping the site and lining the ditch to keep waste from going into the ditch.

Next one, please. Land use controls would prevent residential development from the site; digging, and it would prevent groundwater use at the site. And after the cap is put in place, there will be periodic inspections to make sure that the cap hasn't been damaged. It's to make sure -- I'll get to that later -- any of the wells or -- make sure they haven't been damaged.

Our last item is landfill gas vents along the perimeter and they would be sampled regularly. And the landfill gas vents is pretty much standard landfill closure procedures.

This particular site -- the last waste was deposited in '76, over 30 years ago.

And the nature of this site compared to other sites, there's probably very little gas being generated.

Okay. Next one. And then finally, the last is monitoring groundwater would be routinely collected from monitoring wells and analyzed for arsenic, dioxins and furans and benzo anthracene.

Next please. And then here's a drawing of some of the things that I've talked about. You can see here, the extent of the cap. Along the ditch, we would excavate the sediment along the bottom and some of the soil long the sides, and then that would be lined with a stone called rip rap. It's a heavy rock covered with concrete to keep it stable. I haven't really shown them but the number of monitoring wells and existing monitoring wells that would be along the site and within the site would be used to monitor the groundwater; check for contamination.

And then as part of the base operations, any activities in this area would be restricted to industrial or in this

case, recreational and more importantly, it wouldn't be used for residential-type activities.

Okay. Next. As part of the feasibility study -- as part of the methodology for doing the feasibility studies, evaluation of the alternatives and this alternative is evaluated against nine criteria that are established for superfund regulations.

Next one, please. And these nine criteria are -- there's first two threshold criteria which any alternative to be acceptable has to meet these two. And that would be overall protectiveness of human health and the environment and then compliance with the ARARs.

And then the alternatives are also compared for what's referred to as balancing criteria which are long-term effectiveness and permanence, reduction of toxicity, mobility or volume of contaminants through treatment, short-term effectiveness implementability and the costs.

Next one. And then the last two refer

to modifying criteria is the state or supporting agency acceptance and also community acceptance. In other words input such as what would come out of this meeting.

Next one, please. On overall protection of human health. Okay. That's talking about how Alternative 2 meets these criteria or how they fit in with these criteria.

Alternative 2 would be protective of human health and the environment. The cover and land use controls would prevent exposure of the contents of the landfill and the groundwater.

Next one, please. Okay. Compliance with the ARARs. The main thing is exposure to soil and groundwater with contaminant concentrations greater than criteria would be prevented. Again, this is part of the cover system and restricting the use.

Next, please. Long-term effectiveness. Again, this alternative is considered to be long-term effective. Capping of landfill is typical practice and this requires maintenance and long-term

inspection.

Okay. Next. The reduction of toxicity and mobility for volumes of treatment. There is very little, if any, reduction of volume or toxicity. However, with a cap, it would reduce the amount of groundwater that goes through the waste and it would limit the mobility of it.

Next one, please. Short-term effectiveness. Short-term effectiveness refers to actions or effects while the alternative's being implemented and during the cover installation, there will be engineering controls, dust suppression, and also workers working under the construction part of it would have to comply with health and safety procedures.

Next, please. Implementability. Covering the landfill is a pretty standard operation that's using common cover materials and common lining materials. The equipment and materials are readily available. Technology for installing monitoring wells and the like is very common. And then land use controls would be

developed by the Navy with -- in concurrence with MDEQ and the EPA.

Next, please. The cost for Alternative 2 is estimated to be approximately $3.7 million. Annual costs associated with inspections, repairs and the like are estimated to be on the order of $50 to $70,000 per year.

Next, please. So, again, the preferred alternative is the cap, the ditch lining, land use controls, then the monitoring as talked about here.

Comments on the proposed plan, again, I want to point out, there's a copy of the proposed plan on the back table. The last page has a comment form and Gordon Crane's address, and comments are to be sent to Gordon Crane at NCBC Gulfport, 2401 Upper Nixon Avenue, Gulfport, Mississippi 39501 or you can e-mail him at gordon.crane@navy.mil.

And questions about Site 5.

AUDIENCE MEMBER:

Earlier in the presentation, there was a photo of the map. And I see you had something in red on this and I went to look

at this. It's not on here. And go back. One of the first ones that shows the landfill.

MR. LOGAN:

Okay. Keep going to the very first one.

AUDIENCE MEMBER:

It's like the first --

MR. LOGAN:

It's like the second or third slide.

AUDIENCE MEMBER:

There. What is that right there?

MR. LOGAN:

That's underground. This is part of the drainage ditch system, and that really just shows a reinforced concrete pipe that extend up a little bit.

AUDIENCE MEMBER:

Okay. It wasn't in here and I just didn't really catch what it was.

MR. CONRAD:

That's a drainage under the road.

MR. FISHER:

You're right. What we didn't talk about is how thick the cap would be.

MR. LOGAN:

Yeah. I didn't include any detail on the cap. That would all might depend on the final use. The capping of itself, it usually may be a foot or two of material just to even it out and also to provide some slope to it. EG 1 to 4 percent slope. Over that, is a small clay liner, and then over that is another layer of approximately 18 inches of sand and then that would be planted with top soil and grass.

And like I said, the uses -- the Navy's current plan to use this site is for recreation-type activities. And I think right now, it's being considered part of another driving range.

AUDIENCE MEMBER:

How did you all identify that site?

MR. LOGAN:

Pardon?

AUDIENCE MEMBER:

What prompted the investigation that allowed you to --

MR. FISHER:

The Navy has a program called

"Installation Restoration Program" that looks at previous sites that may be hazardous or may have been used to dispose of material, and part of the kickoff of that program was to identify any potential sites, not just the NCBC, but all the Navy. So that was part of their earlier program to identify sites. They interviewed people, they look at records, and Site 5 was one of the sites they initially identified when they first looked at the base. They identified others as well that we talked about on a regular basis.

AUDIENCE MEMBER:

I'm just kind of curious how far out past the landfill would this cap extend?

MR. LOGAN:

Can you go to that other drawing? This is preliminary. It really wouldn't extend too far beyond the waste itself.

AUDIENCE MEMBER:

You mean, in the square area?

MR. LOGAN:

Yeah. That's generally showing what

it is. Again, this is a preliminary-type drawing.

AUDIENCE MEMBER:

And this is pretty well gonna take care of any moisture coming into that contaminated area?

MR. LOGAN:

That's the idea, yes. There's a clay liner.

AUDIENCE MEMBER:

When you did your study and your drilling into it, what was the water level in there?

MR. FISHER:

We did a water level that was 6 to 8 feet.

AUDIENCE MEMBER:

How deep is that? Did you do a sediment? Did you do a side dig and go in?

MR. FISHER:

We didn't do any angle drilling. We did -- we did about 75 drills through the landfill all over. So we covered the site.

AUDIENCE MEMBER:

I'm just really curious because I'm

thinking of how shallow it is because I know my land on Canal Road, I can take a shovel and walk out in the backyard and I always dig less than 2 feet and I can get water. So you got me curious. That's why I'm asking these questions.

MR. FISHER:

This is a little bit higher area and that's why they have it a little bit deeper, more on top of it. I think where you're getting at, yes, they intended to dig those trenches in two groundwater so the waste didn't meet contact with groundwater and that's one of the things --

AUDIENCE MEMBER:

Cap it, now.

MR. FISHER:

One of the things -- I guess, another thing about the cover, when you just look at that image, what you're not really seeing is -- say this is the landfill itself. The cover is going to go --

AUDIENCE MEMBER:

Go over the top ground cover, any further rain from coming and I'm thinking

the rains that we got coming in, we're in rainy season, and the rain we get around here --

MR. FISHER:

That -- what the --

AUDIENCE MEMBER:

And what I'm looking at is ground flow as it comes in around that, say, around the base, around over here and flows down and get through the shallow wells to the aquifer because also on my land is a 40-foot well that my father dug. So I'm looking at -- water flows through here. I understand your cap, but I understand water flows down through there and that's what I'm really interested in.

And then at what point during the year is that ditch dry while we're talking about water levels? Is there a time during the year that you don't have water sitting in that ditch while we're talking about water flow?

MR. FISHER:

Not very often.

AUDIENCE MEMBER:

And was that done during your study, because I'd really like to see pictures of that dry ditch.

MR. FISHER:

It's very rarely dry.

AUDIENCE MEMBER:

We know that there really is water flowing around that ditch.

MR. FISHER:

That's one of our concerns.

AUDIENCE MEMBER:

Dig up the dirt and rocks.

MR. FISHER:

Digging out the ditches in two trenches, and the contaminants that are in there in that sediment will come out and be taken away. The other thing it does is when we replace it with the rip rap and the concrete that protects anymore --

AUDIENCE MEMBER:

Coming into --

MR. FISHER:

-- erosion from going into the -- exposing that -- the waste. And that's

probably one of the most important parts of this is preventing erosion back into that landfill and exposing those contaminants and exposing that material.

AUDIENCE MEMBER:

Will there be a screen coming from that cap into that ditch and stop that water from entering that ditch? Is there gonna be a filter system? I know you don't understand what I'm asking. Are we gonna put a filtration system coming from that sediment pile or that old dump site before -- when it comes out of there and goes into those ditches where we're gonna put the rubber liner and have to dig out the field dirt, okay, on the side, and after we put our rocks in there and we lined it all nice and pretty and we put our cap on it, is there a filtration system going into effect that is gonna disallow any rain water that comes in around it to allow it to seep through the ground through this waste and into that drainage system. That's what I'm asking because we don't --

COURT REPORTER:

I'm sorry, I can't hear.

MS. ROUSE:

The transcriptionist is having trouble following.

MR. FISHER:

The question is about how would it prevent groundwater and surface water interaction. The thing that's going to prevent that is having that liner in that ditch there. You're not gonna get a lot of seepage from the ditch.

AUDIENCE MEMBER:

Not gonna get a lot of seepage.

MR. FISHER:

Correct. So we're gonna concrete that off. You're gonna get that seepage into the landfill.

AUDIENCE MEMBER:

Okay.

MR. FISHER:

Coming back out, you're not going to get a lot of that seepage because of that cap.

AUDIENCE MEMBER:

That's what I want to know. Is that

cap gonna go in behind that ditch wall or you're gonna put a barricade in there behind it.

MR. FISHER:

They're gonna dig that out and dig a second trench around the landfill so they can tuck that down in below and fill that --

AUDIENCE MEMBER:

And that's gonna be below ditch level.

MR. FISHER:

It will go in the deep ditch itself, yes, behind it. Not directly in the ditch but --

AUDIENCE MEMBER:

Yeah. Behind that ditch.

MR. FISHER:

Behind that concrete liner.

AUDIENCE MEMBER:

Okay. Get that detail somewhere in there with --

AUDIENCE MEMBER:

It really shouldn't because it looks that liner's gonna, you know, go into the ditch. You see how your blue line shows it going right into that ditch bank, and then

you're showing your rocks right there in the end and your liner is just coming straight out. And to me, that's not showing a filtration system. And it actually looks like you're gonna tuck your liner into the ditch bank and you're gonna still let any rain water and the heavy rains -- you guys understand the rains we get around here. And you're about to cap it and you're gonna let any groundwater come straight in right underneath that out to your ditch that you just cleaned out and rubber-lined and that's gonna let sediment take the highway out.

MR. FISHER:

Yeah. That's where the -- in the design drawings that they're working on, they have that detail showing how we tuck that and bring that cap -- that low permeability or that invertible layer down and tuck it. See, here's your ditch. It's gonna tuck in underneath it at the concrete and come up over the top and protect it. That clay could be eroded out if rain water --

AUDIENCE MEMBER:

That's what I was asking. What kind of barricade is there between that dump and that ditch to try to support it?

MR. FISHER:

And that's why it gets so expensive because of that. And then if we just cover it with that soil, it wouldn't be that expensive. Because that ditch is so close to the site, it takes a lot reworking the soil to get that tucked in like that.

AUDIENCE MEMBER:

That's all I have.

MR. LOGAN:

Okay. That wraps it up. If there's any questions later, talk to him or me about it, okay?

This closes the Site 5 proposed plan presentation.

MS. ROUSE:

This part of the meeting is over and now we're just gonna have an informal discussion, and I will take some minutes.

(END OF PROCEEDINGS.)

C E R T I F I C A T E

STATE OF MISSISSIPPI)

COUNTY OF HARRISON)

I do hereby certify that the above and foregoing transcript of proceedings in the matter aforementioned was taken down by me in machine shorthand, and the questions and answers thereto were reduced to writing under my personal supervision, and that the foregoing represents a true and correct transcript of the proceedings given by said witness upon said hearing.

I further certify that I am neither of counsel nor of kin to the parties to the action, nor am I in anywise interested in the result of said cause.

s/ Alisa Marie Dorilma
ALISA MARIE DORILMA, CSR
MISSISSIPPI CSR-1792
NOTARY PUBLIC

REPORTER'S PAGE

I, Alisa M. Dorilma, in and for the State of Alabama, the officer, before whom this sworn testimony was taken, do hereby state on the record:

That due to interaction in the spontaneous discourse of this proceeding, dashes (--) have been used to indicate pauses, changes in thought, and/or talk overs; that same is the proper method for a court reporter's transcription of proceeding; that the dashes (--) do not indicate that words or phrases have been left out of this transcript; and that any words and/or names which could not be verified through reference material have been denoted with the phrase "(phonetic)."

s/ Alisa M. Dorilma

Alisa M. Dorilma, CSR-1792